CLAIMS

1. A method of predicting the health of a plurality of tools based on temporally ordered input data representing parameters indicative of tool health, the method comprising the steps of:

using a sliding time window to partition the input data into temporally displaced data sets;

using non-linear regression to determine, based on the data sets, a set of predictive values relating to tool health at a future time; and

determining a tool-health metric based on one or more of the predictive values.

2. The method of claim 1, wherein the tool-health metric is likelihood of tool failure.

3. The method of claim 1, wherein the data sets include only historical data.

4. The method of claim 1, wherein the data sets include discrete representations of continuous data.

5. The method of claim 4, wherein the data sets include Fourier coefficients.

6. The method of claim 4, wherein the data sets include wavelet coefficients.

7. The method of claim 1, wherein the data sets include operational data.

8. The method of claim 1, wherein the data sets include maintenance data.

9. The method of claim 1 further comprising creating intermediate neural networks for subsets of the data in the data sets.

10. The method of claim 9 further comprising creating an overseer neural network to accept outputs from the intermediate neural networks as input and to produce the tool heath metric as output.

11. The method of claim 10 further comprising using a moving average to smooth the output of the overseer network.

12. A system for predicting the health of a plurality of tools based on temporally ordered input data representing parameters indicative of tool health, the apparatus comprising:

a data module for receiving the input data; and

an analysis module for (i) partitioning the input data into temporally displaced data sets, (ii) using non-linear regression to determine, based on the data sets, a set of predictive values relating to tool health at a future time, and (iii) determining a tool-health metric based on one or more of the predictive values.

13. The system of claim 12, wherein the tool-health metric is likelihood of tool failure.

14. The system of claim 12, wherein the data sets include only historical data.

15. The system of claim 12, wherein the data sets include discrete representations of continuous data.

16. The system of claim 15, wherein the data sets include Fourier coefficients.

17. The system of claim 15, wherein the data sets include wavelet coefficients.

18 The system of claim 12, wherein the data sets include operational data.

19. The system of claim 12, wherein the data sets include maintenance data.

20. The system of claim 12 wherein the analyzer further creates intermediate neural networks for subsets of the data in the data sets.

21. The system of claim 20 wherein the analyzer further creates an overseer neural network to accept outputs from the intermediate neural networks as input and to produce the tool heath metric as output.

22. The system of claim 21 wherein the analyzer uses a moving average to smooth the output of the overseer network.

23. A system for predicting the health of multiple tools based on temporally ordered input data representing parameters indicative of tool health, the system comprising:

means for receiving input data;

means for partitioning the input data into temporally displaced data sets;

means for using a non-linear regression model to determine a set of predictive values relating to tool health at a future time; and

means for determining a tool-health metric based on the set of predictive values.